

**CLAIMS**

1. A process for the formation of nanostructures that includes:

- 5                   - the formation of nucleation sites (4), in volume, by the irradiation of a substrate (2) by means of a beam of silicon or germanium ions, by localised deposition of atoms suitable for the formation of such sites,
- 10                   - the growth of nanostructures (8) on the nucleation sites thus formed.

2. A process according to claim 1, where the growth is achieved by chemical vapour deposition.

15                   3. A process according to claim 1 or 2, with the substrate in a dielectric material.

4. A process according to claim 3, with  
20 the substrate being a silicon dioxide ( $\text{SiO}_2$ ) or an aluminium oxide ( $\text{Al}_2\text{O}_3$ ) or a silicon nitride ( $\text{SiN}_x$ ).

5. A process according to one of claims 1 to 4, with the nanostructures formed being in a  
25 semiconductor material.

6. A process according to claim 5, with the semiconductor material being silicon or germanium.

30                   7. A process according to claim 6, with the structures formed being created respectively by

means of dichlorosilane or germane, as a gaseous precursor.

8. A process according to claim 5, with  
5 the semiconductor structure formed being in a semiconductor material of the column IV type.

9. A process according to claim 8, with  
the semiconductor structure formed being in silicon  
10 carbide (SiC) or in Diamond C.

10. A process according to claim 5, with  
the semiconductor structure being in a III - V type  
semiconductor material.

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11. A process according to claim 5, with  
the semiconductor structure being in gallium arsenide  
(GaAs), or in gallium nitride (GaN), or in gallium  
phosphide (GaP).

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12. A process according to one of claims 1  
to 4, with the nanostructures formed being in a  
metallic material.

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13. A process according to one of claims 1  
to 12, with the nanostructures formed being in 3  
dimensions.

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14. A process according to one of claims 1  
to 13, with the nanostructures formed being of maximum  
diameter (D) between 1nm and 15nm.

15. A process according to one of claims 1 to 14, with the nanostructures being formed at a density between  $10^8/\text{cm}^2$  and  $10^{13}/\text{cm}^2$ .